

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Minoru Kouda et al.

Serial No.:

Filed:

For: POWDER COMPRESSION MOLDING
METHOD AND APPARATUS AND
DRY CELL

Previous Examiner: S. Staikovici

Previous Group Art Unit: 1732

Irvine, CA 92614

January 25, 2001

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to an examination on the merits of the above-identified application, please enter the following amendments:

IN THE SPECIFICATION:

Page 12, line 3, delete "he remained" and insert --remain--;

Page 38, line 15, delete "step of";

line 16, after "procedure" insert --steps--.

IN THE CLAIMS:

Please cancel Claims 22-28 without prejudice.

Please add the following newly drafted Claims 29-44.

1 29. A powder compression molding and assembly system comprising:

2 a rotary disk;

3 a plurality of molding units mounted on the rotary disk at spaced circumferential

4 locations, each of said plurality of molding units including a cylindrical die, a lower plunger

5 concentric with said cylindrical die, an upper plunger, and a center pin concentric with said

6 lower plunger for defining annular space within said die for molding powder into tubular

7 configurations, as the plurality of the molding units are moved along a circular path;

8 a pair of pressure rollers provided at least at two equally spaced locations on the

9 movement path of the plurality of molding units for pressure engagement with the upper plunger

10 and the lower plunger, respectively, of each of said plurality of molding units; and

11 a plurality of loading units provided respectively to each of the plurality of molding units

12 and moved along a concentric path with the molding units, for transferring and retractably

13 positioning a cylindrical container above and in alignment with the die of each of the molding

14 units.

1 30. The powder compression molding and assembly system according to Claim 29,

2 further comprising a first cam provided immediately downstream of the pair of pressure rollers

3 in a direction of rotation of the rotary disk, for lifting up the center pin and the lower plunger of

4 the molding unit.

1 31. The powder compression molding and assembly system according to Claim 30
2 further comprising a stationary second cam provided in coaxial arrangement with the rotary disk,
3 wherein each of said plurality of loading units includes a cam follower for engagement with said
4 second cam.

1 32. The powder compression molding and assembly system according to Claim 31,
2 wherein said stationary second cam comprises a first cam surface for causing the loading units to
3 track the concentric path with the molding units, and a second cam surface for causing the
4 loading units to advance towards between the upper plunger and the lower plunger of the
5 molding units.

1 33. The powder compression molding and assembly system according to Claim 32,
2 wherein each of the loading units comprises an operating lever operatively connected to said cam
3 follower, a support arm connected to said operating lever and rotatably supported on the rotary
4 disk, a case holding means mounted on said support arm, and a convey jig detachably supported
5 on the case holding means, said convey jig supporting the cylindrical container such that an open
6 end of the cylindrical container faces downwards.

1 34. The powder compression molding and assembly system according to Claim 33,
2 further comprising a means for closing and opening the open end of the cylindrical container.

1 35. The powder compression molding and assembly system according to Claim 29,
2 wherein said pair of pressure rollers are provided at a plurality of locations corresponding to a
3 number of the tubular configurations to be inserted into one cylindrical container.

1 36. The powder compression molding and assembly system according to Claim 35,
2 further comprising a means for supplying a plurality of cylindrical containers one after another to
3 each of the loading units, said means for supplying the cylindrical containers being provided
4 downstream of one of said pressure rollers in a direction of rotation of the rotary disk.

1 37. The powder compression molding and assembly system according to Claim 36,
2 wherein the cylindrical containers are supplied to the loading units as being held with respective
3 convey jigs.

1 38. The powder compression molding and assembly system according to Claim 36,
2 further comprising a means for receiving the cylindrical containers one after another from each
3 of the case holding means after a predetermined number of tubular configurations have been
4 inserted into the cylindrical containers, said means for receiving the cylindrical containers being
provided downstream of one of said pressure rollers in a direction of rotation of the rotary disk.

1 39. The powder compression molding and assembly system according to Claim 38,
2 wherein the cylindrical containers are transferred from the loading units to a next step as being
3 held with respective convey jigs.

1 40. A method of manufacturing dry cells with a system for compression molding
2 powder into cylindrical pellets with a rotary disk mounted with a plurality of molding units at
3 spaced circumferential locations, said molding units each including a cylindrical die, a lower
4 plunger concentric with said cylindrical die, an upper plunger, and a center pin concentric with
5 said lower plunger for defining annular space within said die, said method of manufacturing dry
6 cells comprising the steps of:

7 providing a plurality of loading units respectively to each of said molding units, for
8 holding cylindrical cell cases with an open end thereof facing downwards, said loading units
9 supported on the rotary disk such as to be able to advance toward between the upper plunger and
10 the lower plunger of the molding units;

11 molding a first cylindrical pellet containing cathode mixture for the dry cells with one of
12 the molding units;

13 advancing the loading unit corresponding to said molding unit toward between the upper
14 plunger and the lower plunger of said molding unit, so that the cylindrical cell case held with
15 said loading unit is positioned above and in alignment with the die of said molding unit; and

16 lifting up the center pin and the lower plunger of said molding unit, so that the center pin
17 enters the cylindrical cell case and that the molded cylindrical pellet is inserted into said
18 cylindrical cell case.

41. The method of manufacturing dry cells according to Claim 40, further comprising
2 the steps of:

3 retracting the loading unit from between the upper plunger and the lower plunger of said
4 molding unit;

5 transferring the cylindrical cell case filled with said formed cylindrical pellet with said
6 loading unit together with said molding unit.

1 42. The method of manufacturing dry cells according to Claim 41, further comprising

2 the steps of:

3 molding a second cylindrical pellet with said molding unit;

4 advancing the loading unit filled with said first cylindrical pellet toward between the

5 upper plunger and the lower plunger of said molding unit, so that the cylindrical cell case held

6 with said loading unit is positioned above and in alignment with the die of said molding unit; and

7 lifting up the center pin and the lower plunger of said molding unit, so that the center pin

8 enters the cylindrical cell case and that the molded second cylindrical pellet is inserted into said

9 cylindrical cell case.

10 43. The method of manufacturing dry cells according to Claim 42, further comprising

11 the step of transferring said cylindrical cell case from the rotary disk to a next step in a

12 continuous manner.

13 44. The method of manufacturing dry cells according to Claim 42, further comprising

14 the step of supplying new cylindrical cell cases one after another to the loading units.

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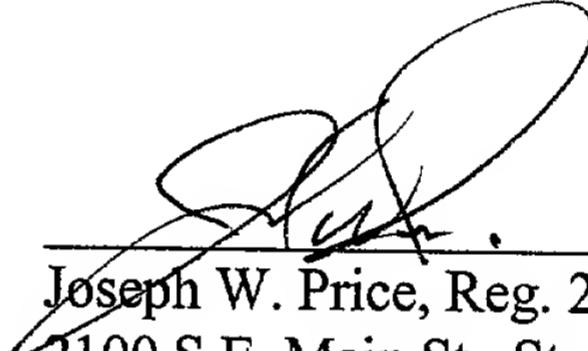
REMARKS

The present application is a divisional application of U.S. Serial No. 08/957,413 and attached hereto is a PTO Form 1449 indicating prior art that was cited in the prosecution of U.S. Serial No. 08/957,413.

If the Examiner believes that a telephone interview will help further the prosecution of this case, he is respectfully requested to contact the undersigned attorney at the listed telephone number.

Very truly yours,

PRICE AND GESS



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